

### **IN THE SPECIFICATION:**

*Please amend the paragraph from line 9-12 of page 1 as follows:*

This invention relates to a crystallizer and method for casting using the same, mainly in casting of middle and low melting point metals, such as aluminum, magnesium, copper and tin, and their alloy, in particular for use in bottom or bottomless tubular casting of these metal castings, especially in casting of aluminum pistons ~~piston~~.

*Please amend the paragraph from line 16-27 of page 1 as follows:*

In metal casting, rapid, bottom-top, sequential crystallization is an ideal mode of crystallization. If it is possible to complete the casting crystallization in this way, there is almost zero defects in the resulting casting. The external condition for achieving the rapid, bottom-top, sequential crystallization is the rapid, bottom-top (thermal current goes from top to bottom), sequential thermal diffusion. Therefore, the rapid, bottom-top, sequential thermal diffusion is a process much ~~sough~~ sought after by casting technicians worldwide. However, the rapid, bottom-top, sequential thermal diffusion can be achieved with very few existing casting technologies, such as electroslog remelting, ingot continuous casting, molten tin infusion process, etc. These technologies have their evident limitations. Those of electroslog remelting and ingot continuous casting are only capable of producing ingot with unvaried shape of cross section, and incapable of making casting of varied shapes. Products made with the molten tin infusion process are so expensive that the process cannot be put into wide industrial application.

*Please amend the paragraph from line 2-18 of page 2 as follows:*

The Chinese patent application CN1098344A has disclosed "a device for casting film metal mould and method for casting using the same", with its configuration as shown in FIG. 25, which comprises a flask **90** , a film metal mould **91** , a spraying nozzle ~~nuzzle~~ **92** , a pull bar **93** and a roof plate **94** . This technology has realized the film mould casting, by using spraying nozzle

nuzzle 92 to spraying cooling medium from bottom to top on the outer wall of film metal mould 91 to perform rapid, from bottom to top, sequential thermal diffusion of casting 88 so as to guide the crystallization interface 89 to progress rapidly from bottom to top. Undoubtedly, this technology plays a positive role in making the process mature for the rapid, bottom-top, sequential thermal diffusion of casting. But it has its own drawbacks: (1) With the spaying method to cool down, the accuracy to control the moving speed of casting crystallization interface is not so precise that the internal quality of casting is still not satisfied. (2) The method of butt resistance welding to weld a plurality of pull bars 93 onto the outer wall of the film metal mould 91, and the other end of the pull bar is fixed on the overall supporter, i.e., flask 90, and film metal mould 91 is fixed through pulling force of the pull bars 93 and the resistance force of roof plate 94. With few supporting points and uneven force on film metal mould, this way of ~~fixing~~ fixing is apt to cause a large area of deformation; and the film metal mould is difficult to disassemble and assemble. These drawbacks call for urgent improvement.

*Please amend the paragraphs from line 20 of page 3 as follows:*

The inner side of position-limiting part of present invention is cut by an cutter to form a fringe. The outer periphery of the cutter corresponds with the mould wall of the film mould. Particularly, the sectional shape of the fringe on the inner side of the position-limiting part is ~~triangle~~ triangular which is truncated by the cutter. The length of truncate arc is 0.5 ~ 6mm. The arc of the two adjacent fringes truncated by cutter is 2 ~ 50mm long.

As a detailed embodiment of present invention, said cutter is cylindrical, whose surface corresponds with the ~~out~~ outer periphery of the mould wall of the film mould.

*Please amend the paragraph from line 2-4 of page 7 as follows:*

The pouring is over. After the casting crystallizes, stop supplying water. A medium-discharging port ~~deseents~~ descends below the bottom end of the medium channel through liquid level controller, and exhausts the cooling medium in the medium channel.

*Please amend the paragraph from line 21 of page 12 to line 13 of page 13 as follows:*

The present invention provides s a method for casting using said crystallizer, comprising the following steps:

- (a) The melting stock 30 is poured into the mould cavity of said crystallizer at the determined speed. Said determined speed must enable the melting stock liquid levels 35, 38 and 76 in the mould cavity to be higher than the cooling medium liquid level 34 in the medium channel;
- (b) When the melting stock fills the bottom part of the mould cavity, and submerges the bottom end of pouring pipe 28-1 up to 10 ~ 30mm in depth, open the water supply box 72, and pour cooling medium 33 into medium channel 17 through a plurality of medium-supplying ports 5;
- (c) The value R of the longitudinal sections of the tubular casting controls the ascending speed of cooling medium liquid level 34, and R is the speed of the vertical movement of the casting crystal interface;
- (d) When the crystallization interface approaches the top of the tubular casting, reduce the value R of cooling medium liquid level 34 or put value R at zero;
- (e) The pouring is over. After the casting crystallizes, stop supplying water. A medium-discharging port 11 descends below the bottom end of the medium channel through liquid level controller 10, and exhausts the cooling medium in the medium channel;
- (f) After the cooling medium is exhausted in the medium channel, the crystallizer is kept in an intermediumte state, and enters an air-cooling time period of 10 to 90 seconds. Then demoulds, takes out the casting, and enters next cycle.

*Please amend the paragraph from line 4-8 of page 19 as follows:*

As shown in the Fig. ~~[[4]]~~ 24, there are continuous or discontinuous variations in its sectional shape of the bottomless tubular casting 99. This tubular casting is regarded as special-shaped tubular casting. Casting special-shaped tubular casting 99 requires that the crystallizer and casting method of the present invention have more features. This embodiment will take the casting 99 as an example to explain the crystallizer and casting method of the special-shaped casting.

*Please amend the paragraph from line 15-21 of page 19 as follows:*

As shown in Figs. 12 and 13, on the basis of the basic crystallizer, each mould seat is cut away two zones 49 and 50. To the cut zone is added metal moulds 52 and 62; after cutting away two zones 49 and 50, a new mould joint 48 forms. The mould ears 8 - 2, 8 - 3, ~~[[92]]~~ 9 - 2 and 9 - 3 should be formed by mould wall 8 - 1 and 9 - 1 extending a width on the mould joint 48. The basic mould cavity surface in the inner side of the metal mould remains consistence with the cylinder 22. On the basic mould cavity surface in the inner side of the metal mould, a platform 63 comes into being, which is the mould cavity surface in which pinhole convex surface 87 is cast.